

NASA TECH BRIEF

Marshall Space Flight Center



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Self-Regenerating Desiccant System

The problem:

The typical solar energy collector, designed for solar-powered heating systems, is sensitive to moisture condensation, which lowers efficiency. To dehumidify continuous air circulating through the system, an elaborate and expensive arrangement of air blowers, desiccant heaters, and controls has to be used.

The solution:

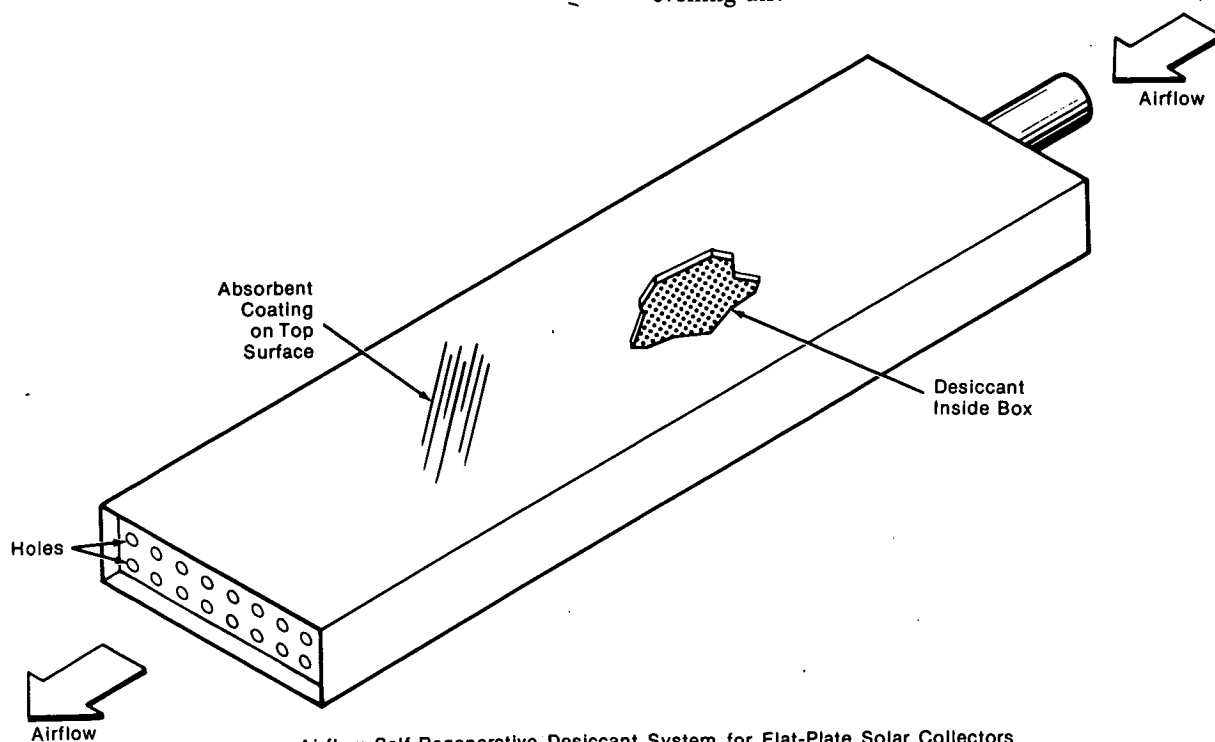
A compact self-regenerating desiccant system uses the inherent diurnal cyclic airflow in the system and the energy of the sun as drying heat.

How it's done:

The self-regenerating desiccant system (shown in the figure) is placed so that air passing into and out of the solar collector passes through the desiccant.

The desiccant (e.g., silica gel) is housed in an aluminum box about 5 by 20 by 1/2 in. (12.5 by 50 by 1.25 cm) with several small holes at one end and a 1/2-in. (1.27-cm) air vent at the other end. In the evening, air is drawn into the collector through the desiccant via the air vent. As the air passes through the box, moisture is removed, and the air is dried.

During the day, as the air in the collector is warmed, it expands and is forced through the many holes in the box, and passes out through the air vent. The top of the box is coated with a special coating that absorbs solar energy to heat the box and its contents. As the hot dry air from the collector passes over the hot desiccant in the box, moisture is removed from the desiccant. By the end of the day, the desiccant will be dry enough to remove moisture from the incoming evening air.



Airflow Self-Regenerative Desiccant System for Flat-Plate Solar Collectors

(continued overleaf)

This system requires no power for operation, has no moving parts to wear out, requires no blowers or manifolds, and is relatively inexpensive to produce. Since the problem of regenerating desiccants is a common one, similar concepts might be useful elsewhere, such as with conventional air-conditioning systems or refrigerating trucks.

Note:

Requests for further information may be directed to:

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Patent status:

Inquiries concerning rights for the commercial use of this invention should be addressed to:

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